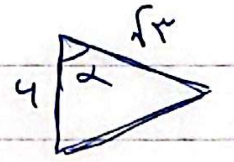
تاریخ: نیلا داود .　　　　　　۲۰　　　　　　موضوع:

(۱)

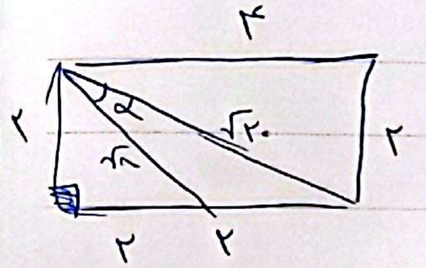


$S = \frac{1}{2} \times \sqrt{3} \times 6 \times \sin\alpha = \frac{9}{2}$

$\sin\alpha = \frac{\sqrt{3}}{2}$ ⟨ $\alpha = 60^\circ$, $\alpha = 120^\circ$ $\longrightarrow \frac{120}{60} = 2$

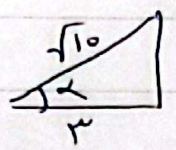
(۲)

(۲)



$S_{\text{رنگی}} = 4\times 2 - \left(\frac{2\times 2}{2} + \frac{4\times 2}{2}\right) = 8 - 2 - 4 = 2$

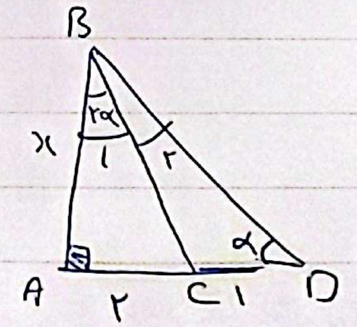
$S_{\text{رنگی}} = \sqrt{20} \times \sqrt{8} \times \frac{1}{2} \times \sin\alpha = 2 \rightarrow \sin\alpha = \frac{1}{\sqrt{10}}$



$\rightarrow \cot\alpha = \frac{3}{1}$

(۲)

(۳)



$\tan B_1 = \frac{AC}{AB} \Rightarrow \tan 2\alpha = \frac{2}{x}$

$\tan D = \frac{AB}{AD} \Rightarrow \tan\alpha = \frac{x}{3}$

(۲)

$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha} \Rightarrow \frac{2}{x} = \frac{2\times\frac{x}{3}}{1-\left(\frac{x}{3}\right)^2} \Rightarrow \frac{2}{x} = \frac{\frac{2x}{3}}{\frac{9-x^2}{9}} \Rightarrow$

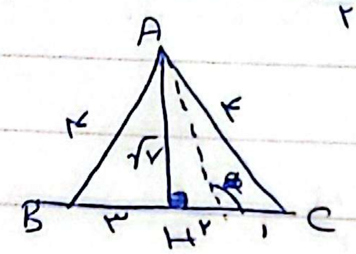
$\frac{2}{x} = \frac{6x}{9-x^2} \rightarrow 18 - 2x^2 = 6x^2 \longrightarrow 8x^2 = 18$

$x^2 = \frac{9}{4} \longrightarrow x = \frac{3}{2}$

$\cot\alpha = \cot D = \frac{AD}{AB} = \frac{3}{x} \Rightarrow \frac{3}{\frac{3}{2}} \Rightarrow 2$

۴) چون مثلث متساوی الساقین است پس $AB = AC = 4$ پس AH هم میانه است و هم ارتفاع پس:

$$\tan(\pi - \alpha) = -\tan\pi = \frac{\sqrt{7}}{3} \Rightarrow \tan\alpha = -\frac{\sqrt{7}}{3}$$



۵)

$$2\sin^2 x + \cos^2 x = \frac{4}{3} \xrightarrow{\div \cos^2\alpha} 2\tan^2 x + 1 = \frac{4}{3}(1+\tan^2 x)$$

$$6\tan^2 x + 3 = 4 + 4\tan^2 x \rightarrow 2\tan^2 x = 1 \rightarrow \tan^2 x = \frac{1}{2}$$

۶)

$$A = \frac{\sin^4\alpha + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{\cos^4\alpha + 4\sin^2\alpha}{1+\sin^2\alpha}$$

$$A = \frac{(1-\cos^2\alpha) + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{(1-\sin^2\alpha)^2 + 4\sin^2\alpha}{1+\sin^2\alpha}$$

$$A = \frac{(1+\cos^2\alpha)^2}{1+\cos^2\alpha} - \frac{(1+\sin^2\alpha)^2}{1+\sin^2\alpha} = \cos 2\alpha$$

موضوع .... تاریخ ....

$\cos\alpha = -\frac{3}{5}$ ← ناحیه ۳

$\tan\alpha = \frac{4}{3}$

$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} \to 1+\frac{16}{9} = \frac{1}{\cos^2\alpha} \to \cos^2\alpha = \frac{9}{25}$

(۷)

$\sin^2\alpha = 1-\cos^2\alpha \to \sin^2\alpha = 1-\frac{9}{25} = \frac{16}{25}$

$\sin\alpha = -\frac{4}{5}$ ← ناحیه ۳

$\cot\alpha = \frac{3}{4}$

$\sin(\frac{9\pi}{2}+\alpha) = (\sin 4\pi + \frac{\pi}{2}+\alpha) = \sin(\frac{\pi}{2}+\alpha) = \cos\alpha =$

$\Rightarrow -\frac{3}{5}$

$\cos(\frac{7\pi}{2}-\alpha) = \cos(2\pi + \frac{3\pi}{2}-\alpha) = \cos(\frac{3\pi}{2}-\alpha)$

$\Rightarrow -\sin\alpha = \frac{4}{5}$

$\tan(\alpha - \frac{3\pi}{2}) = -\tan(\frac{3\pi}{2}-\alpha) = -\cot\alpha = -\frac{3}{4}$

عبارت $= (-\frac{3}{5})(\frac{4}{5}) + \frac{3}{4} = \frac{27}{100} = 0/27$

$\cos 4x = \cos\frac{4\pi}{12} = \frac{1}{2}$

(۸)

$\sqrt{2}(\sin x - \cos x) = \sqrt{2}\times\sqrt{2}\sin(x-\frac{\pi}{4}) = 2\sin(-\frac{\pi}{4})$
$= -1$

عبارت $= \frac{3}{2} - 1 = \frac{1}{2}$

NIKAN

۹)

$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$, $1+\tan^2\alpha = \frac{1}{\cos^2\alpha}$

$\tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}} = \frac{\frac{1}{2}}{1-\frac{1}{16}} = \frac{8}{15}$

$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} \Rightarrow 1+\frac{64}{225} = \frac{1}{\cos^2\alpha} \rightarrow \cos^2\alpha = \frac{225}{289}$

$\cos\alpha = \frac{15}{17} \longrightarrow \sin\alpha = \sqrt{1-\frac{225}{289}} = \frac{8}{17}$

$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{\frac{16}{15}}{-7} = \frac{-16}{105}$

۱۰) $\frac{\cot\alpha}{\sin\alpha} > 0$ و $\sin 2\alpha > 2\sin\alpha$

$\frac{\cot\alpha}{\sin\alpha} = \frac{\cos\alpha}{\sin^2\alpha}$

$2\sin\alpha\cos\alpha > 2\sin\alpha$ ← $\sin 2\alpha = 2\sin\alpha\cos\alpha$ ⟶ هر عبارت را به یک سمت ببریم ⟶ $\sin\alpha(\cos\alpha - 1) > 0$

$\cos\alpha - 1 < 0$ فقط زمانی صفر می‌شود که cos برابر ۱ باشد.

به دلیل اینکه $\sin^2\alpha$ مثبت است علامت کسر برابر است با علامت $\cos\alpha$

$\cos\alpha$ ⟵ $\frac{\cos\alpha}{\sin\alpha} > 0$ ⊕ ⟵ $\cos\alpha > 0$ ↓ α در ربع ۴ یا ۱ است

برای اینکه عبارت بزرگتر از صفر باشد باید یکی + و دیگری منفی باشد که $\sin\alpha < 0$

$(\cos\alpha - 1) < 0$

$\cos\alpha > 0$ ⟵ ربع ۱ یا ۴

$\sin\alpha < 0$ ⟶ ربع سوم یا چهارم

} اشتراک آنها ربع چهارم است!